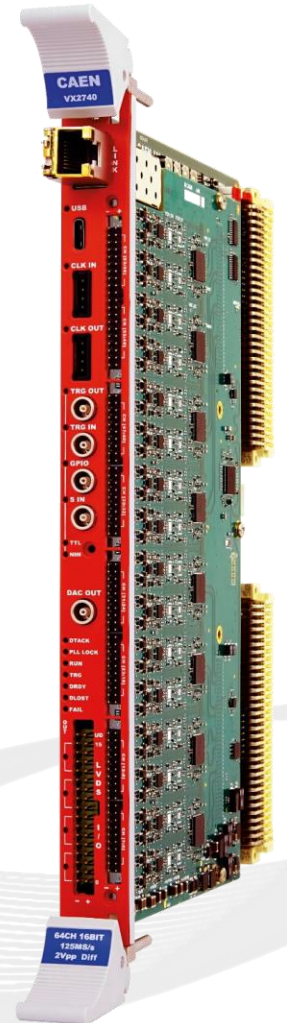# Second School on Waveform Digitizer

Alberto Potenza
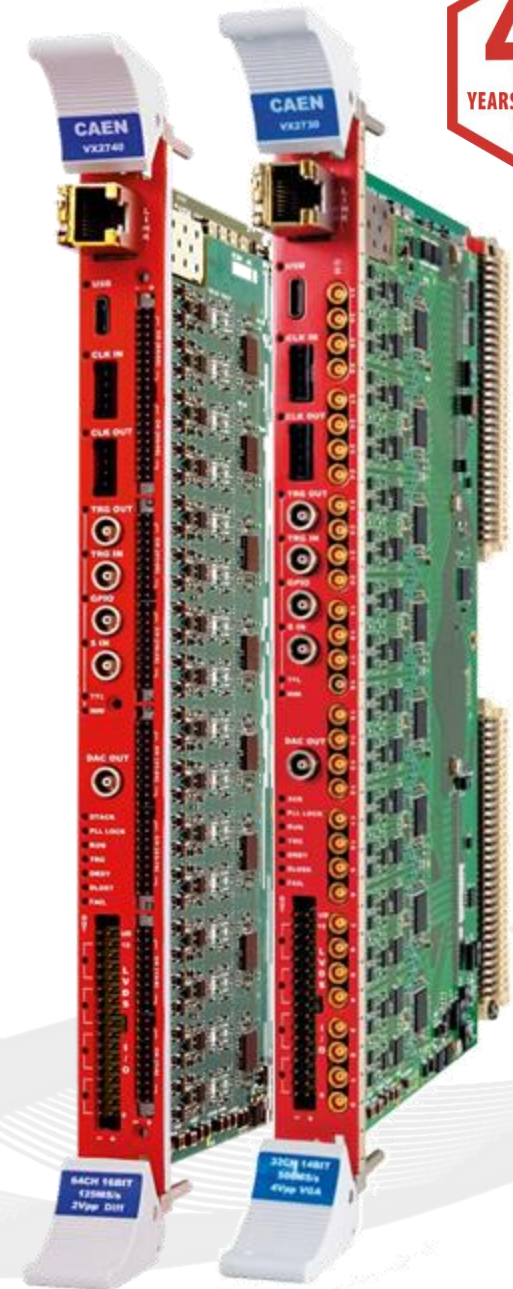**Bruno Angelucci**
Matteo Bianchini

Overview

- What's New

- Firmware Description

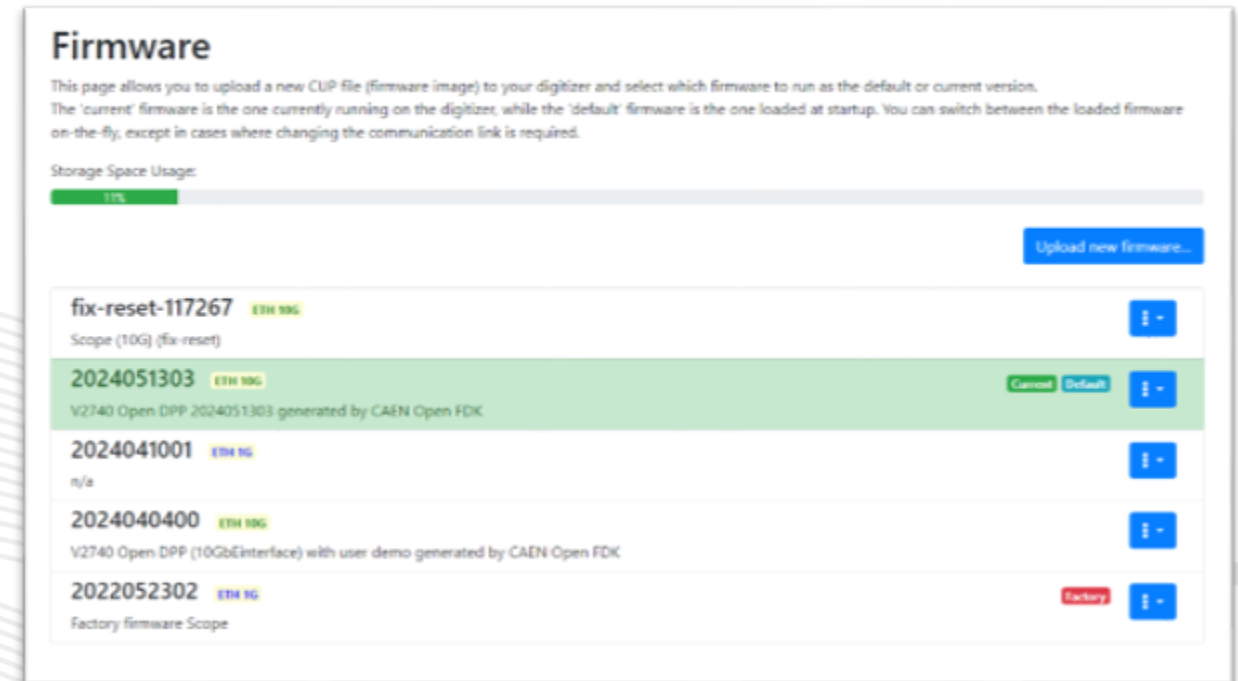- Hands-On

- Questions

What's New

- Higher Channel Density

- Variable Gain Amplifier (VGA)

- Open-FPGA

- Fast Readout: up to 10 Gbps (~800 MB/s UDP)

- Up to 5 GB on-board memory

- Easier Scalability and Synchronization

CAEN
Tools for Discovery

Firmware Description

- Scope

- Digital Pulse Processing (DPP)

- Sci-Compiler

- Firmware Development Kit

Firmware

- Scope

- Digital Pulse Processing (DPP)

- Sci-Compiler

- Firmware Development Kit

Firmware

- Scope

- Digital Pulse Processing (DPP)

- Sci-Compiler

- Firmware Development Kit

Firmware

- Scope

- Digital Pulse Processing (DPP)

- Sci-Compiler
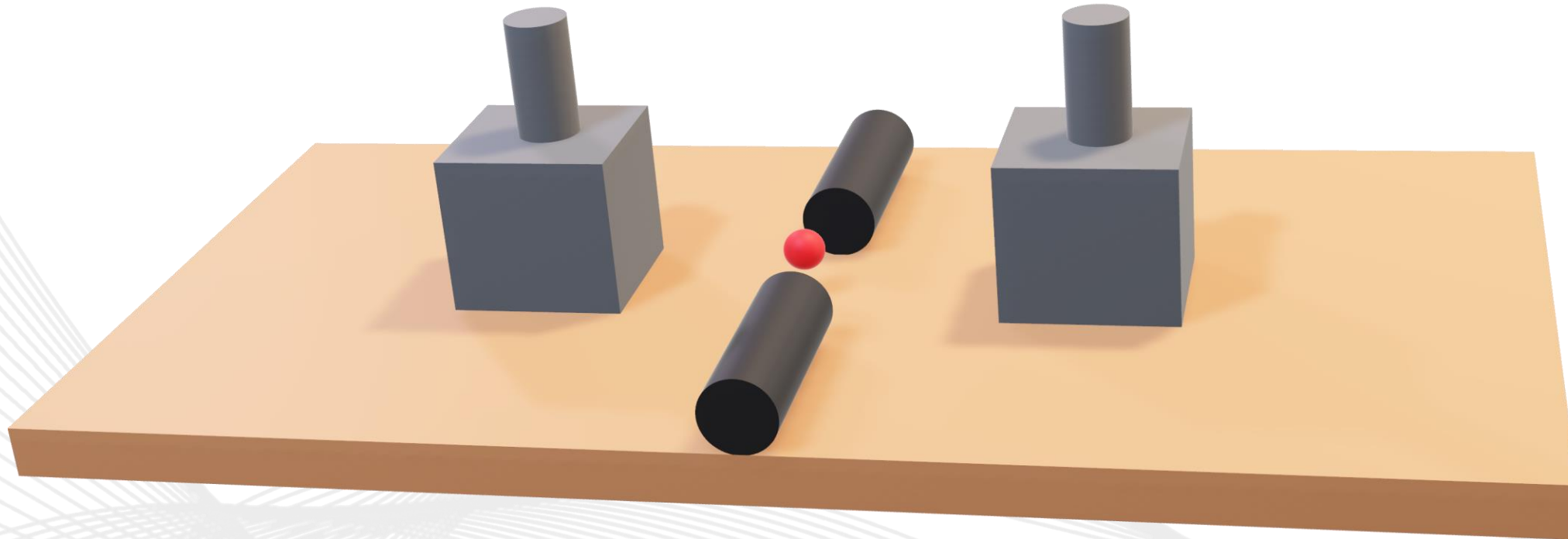
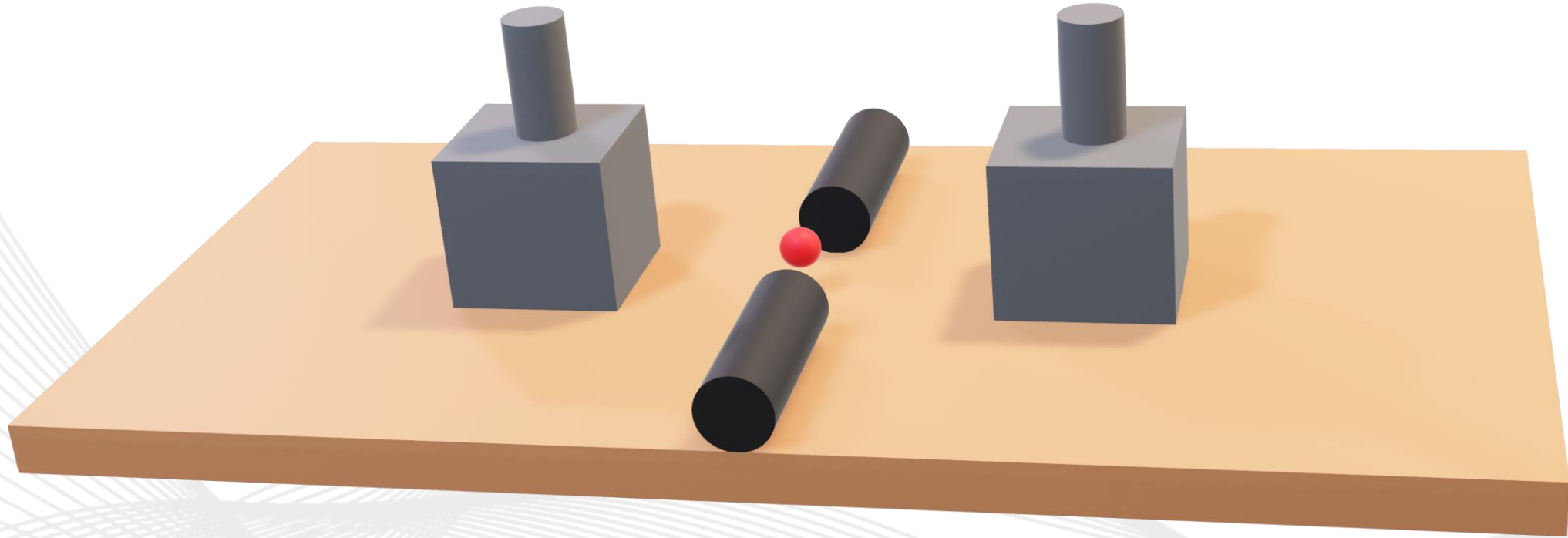- Firmware Development Kit

Firmware

- Scope

- Digital Pulse Processing (DPP)

- Sci-Compiler

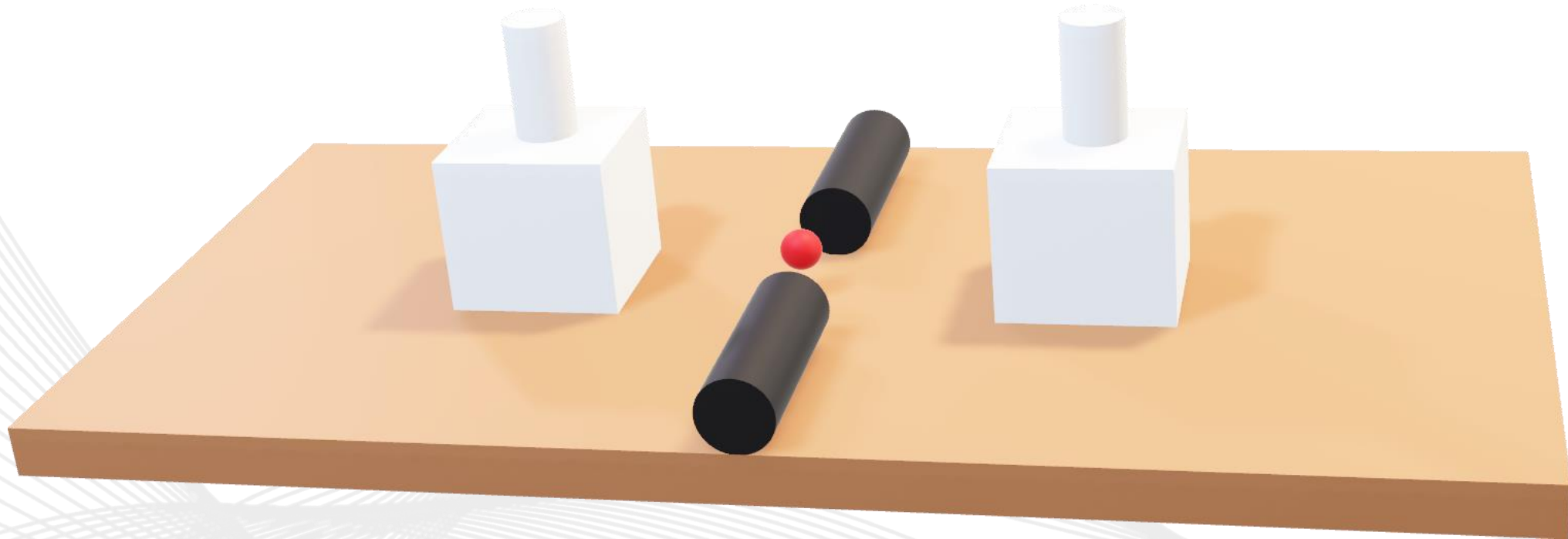- Firmware Development Kit

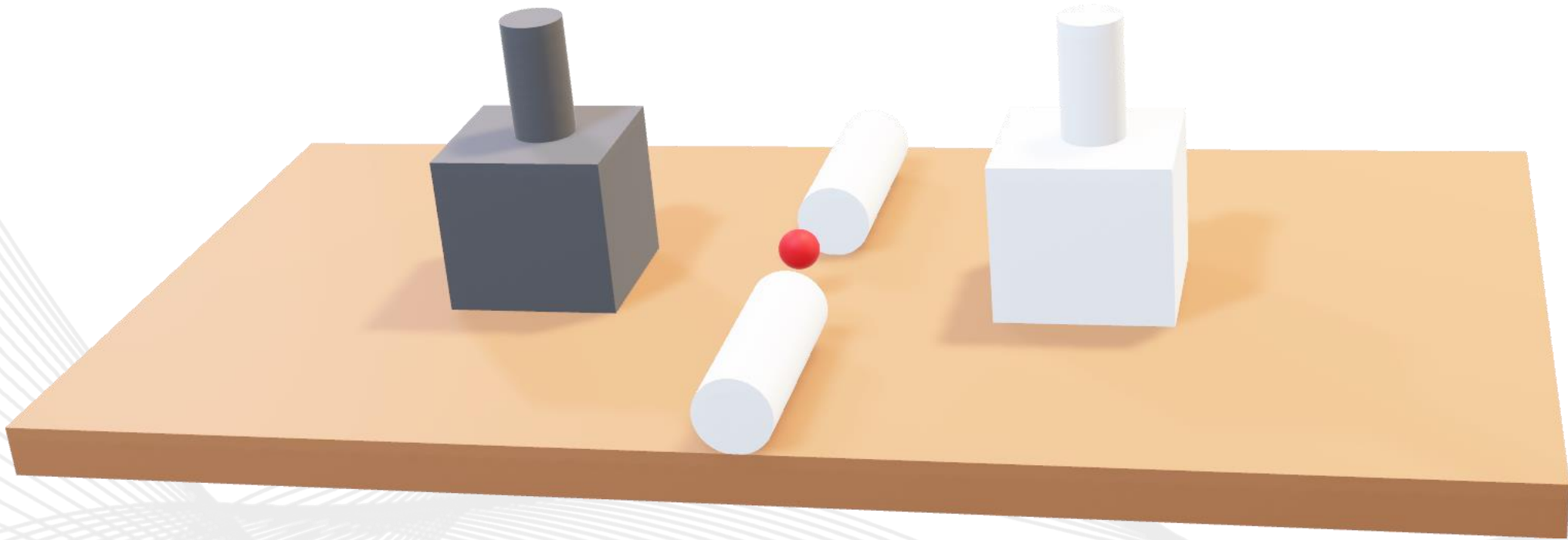# Hands-On

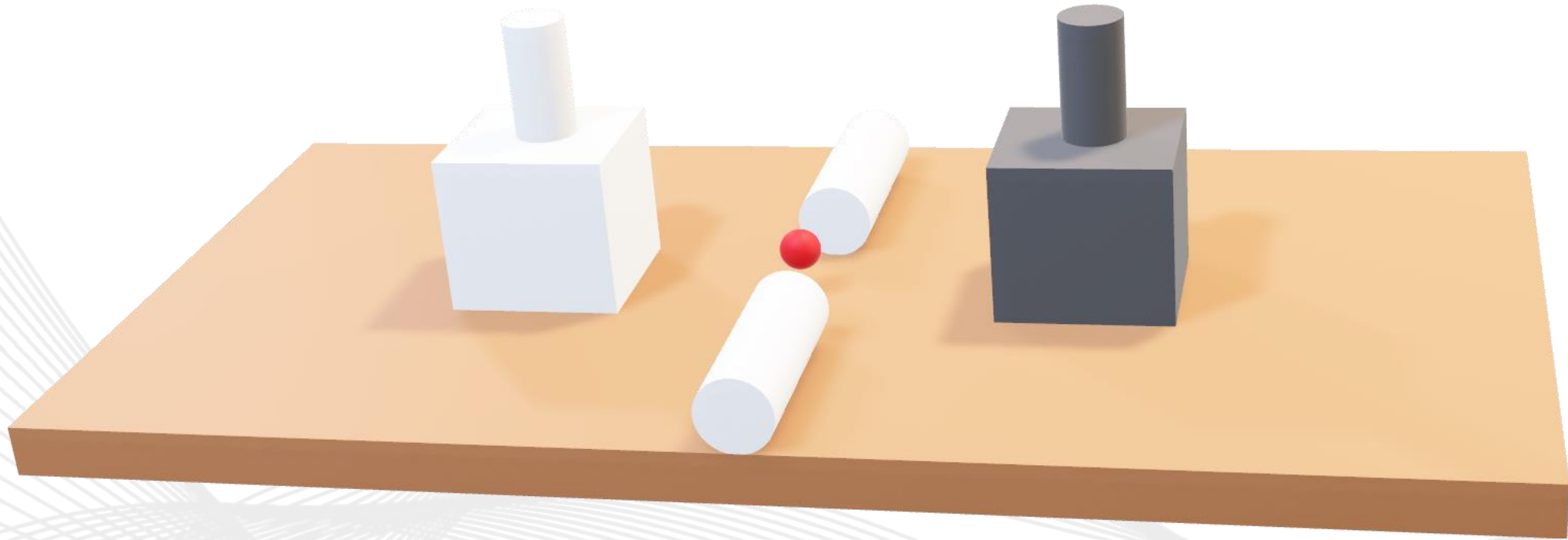

NaI + BaF$_2$

Hands-On

HV Bias : DT5790

Hands-On

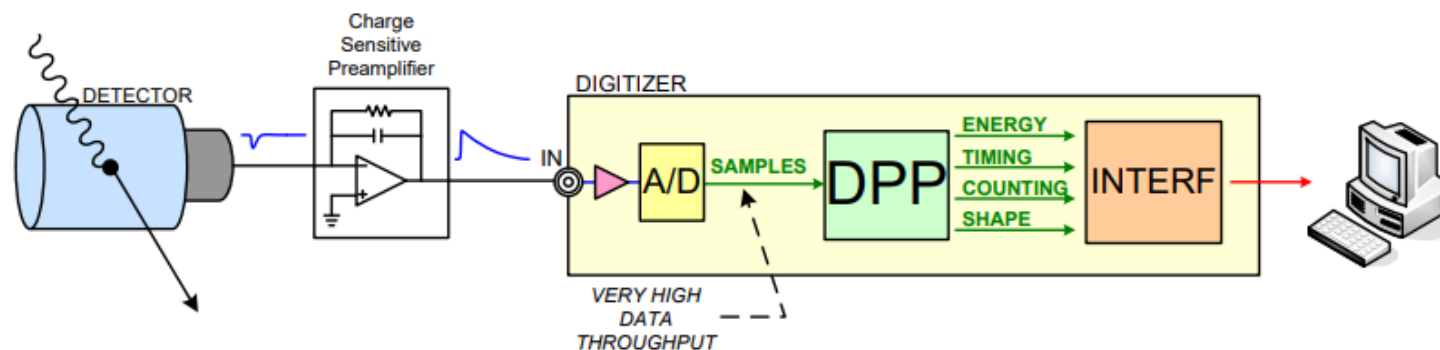# VX2730 DPP PSD

Hands-On

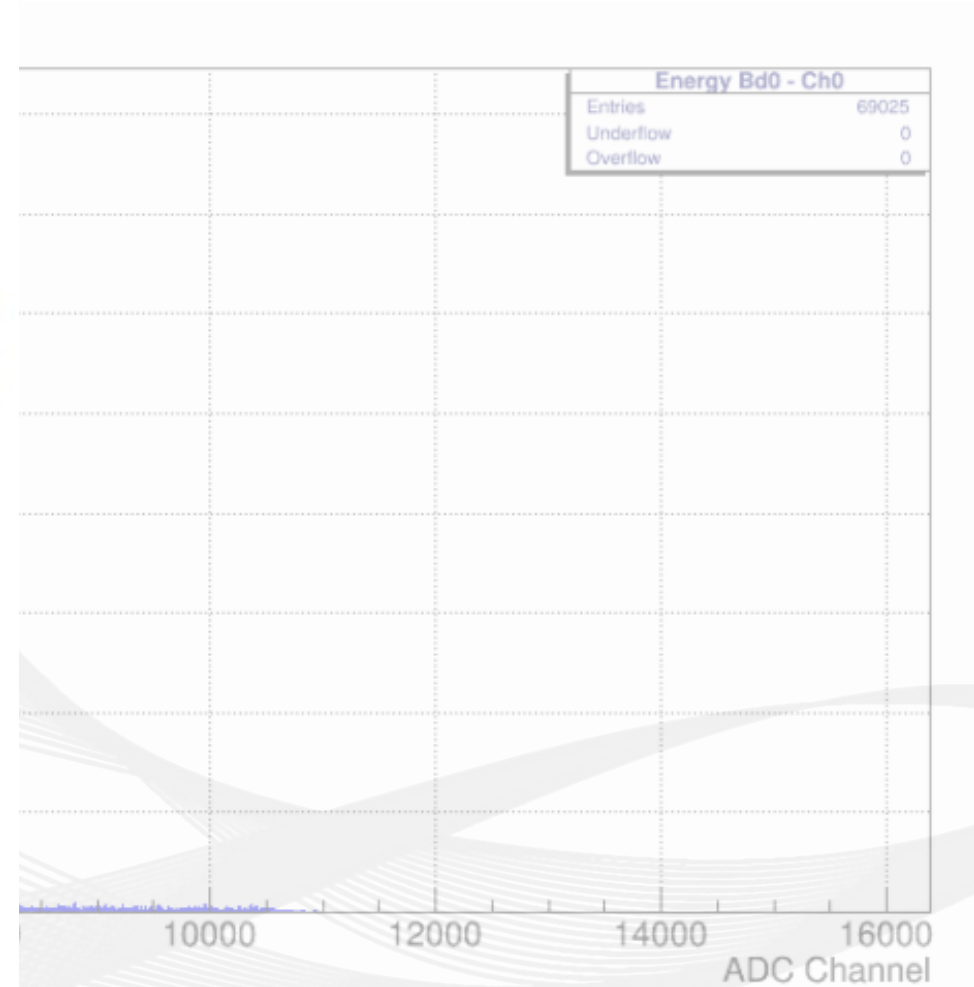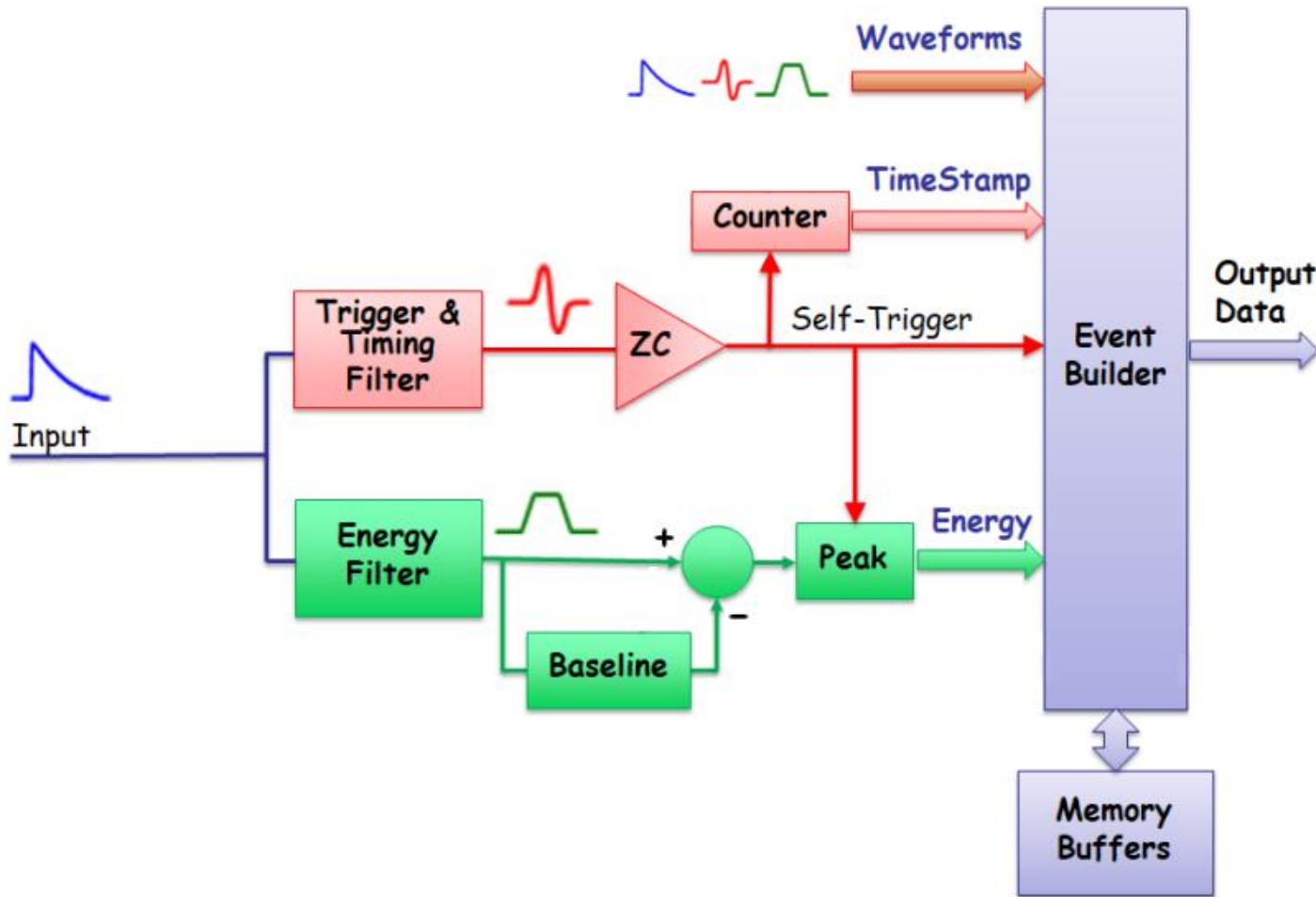# VX2740 DPP PHA + CSP (A1424)

Hands-On

VX2740 DPP PHA
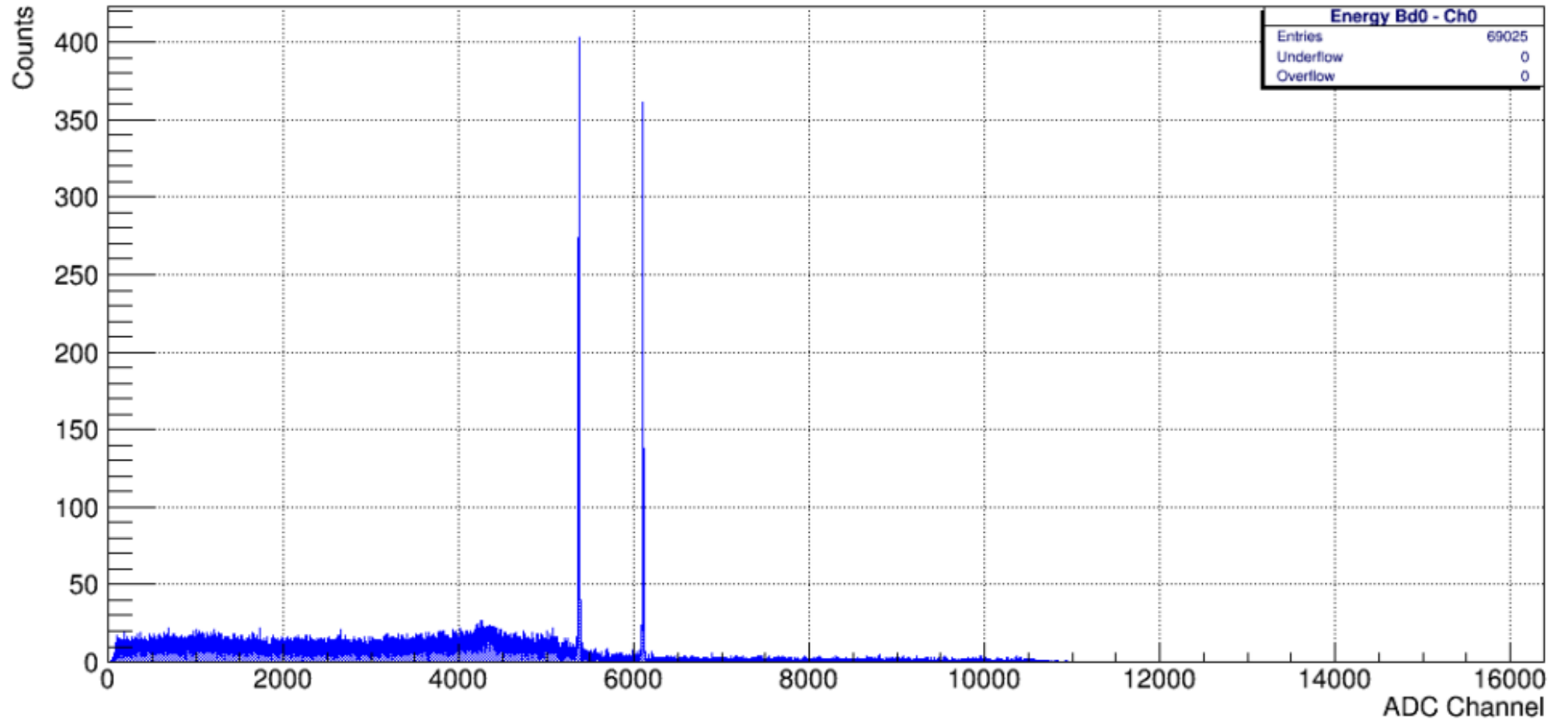
Pulse Height Analysis (PHA)

- Based on a Trapezoidal Filter

- Suited for CSP Signals

- Suited for direct <u>Exponential</u> Signals

- Allows to obtain High Resolution Energy Measurements
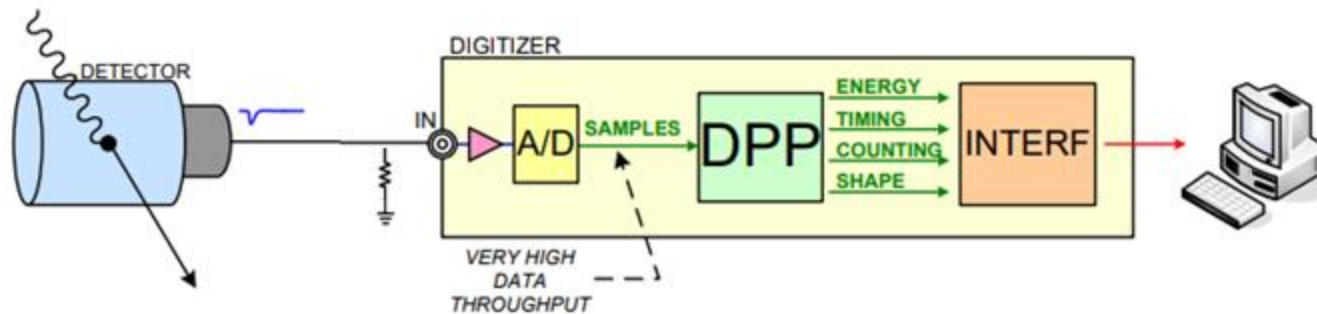
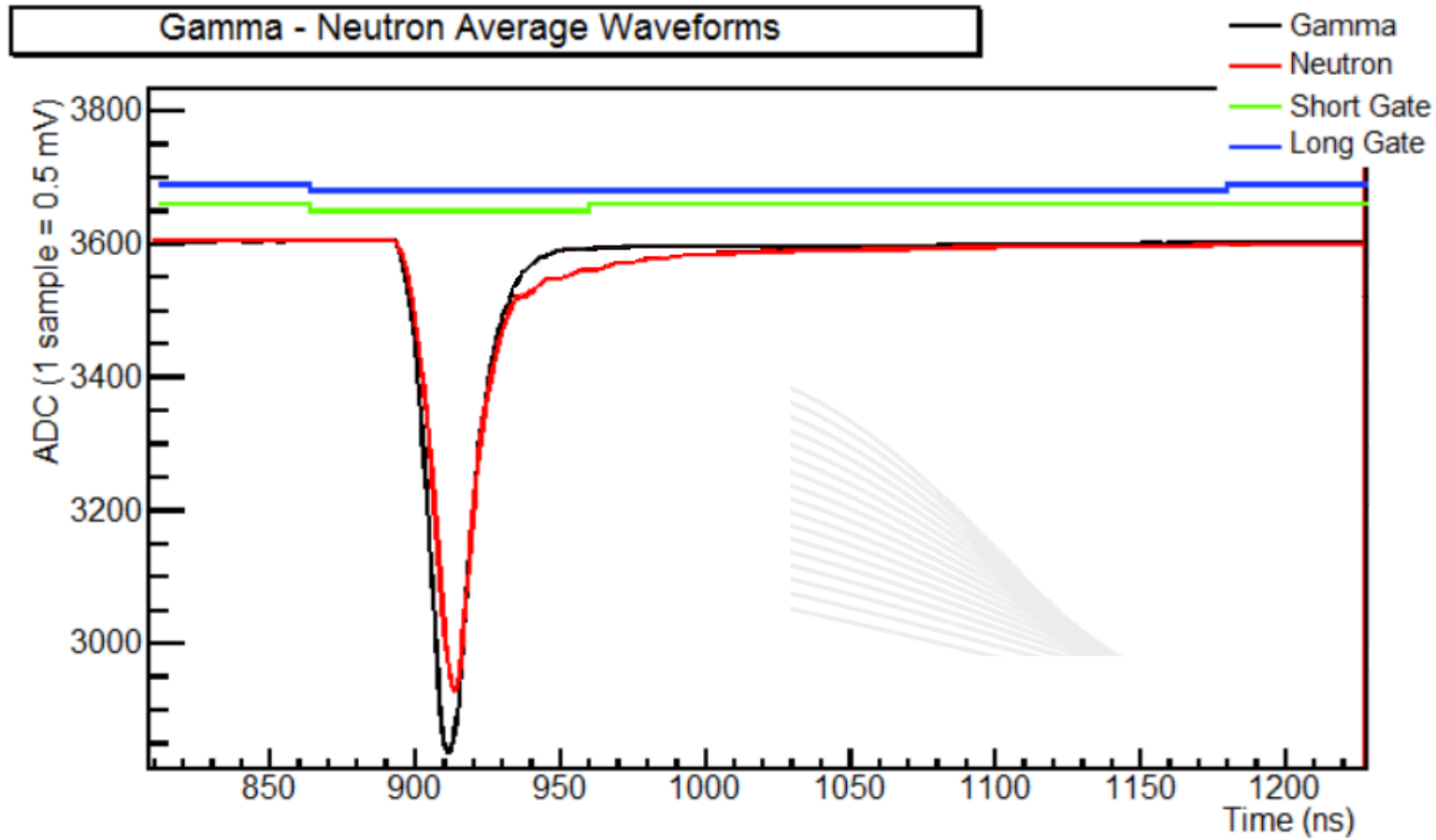# Pulse Height Analysis (PHA)

Pulse Height Analysis (PHA)
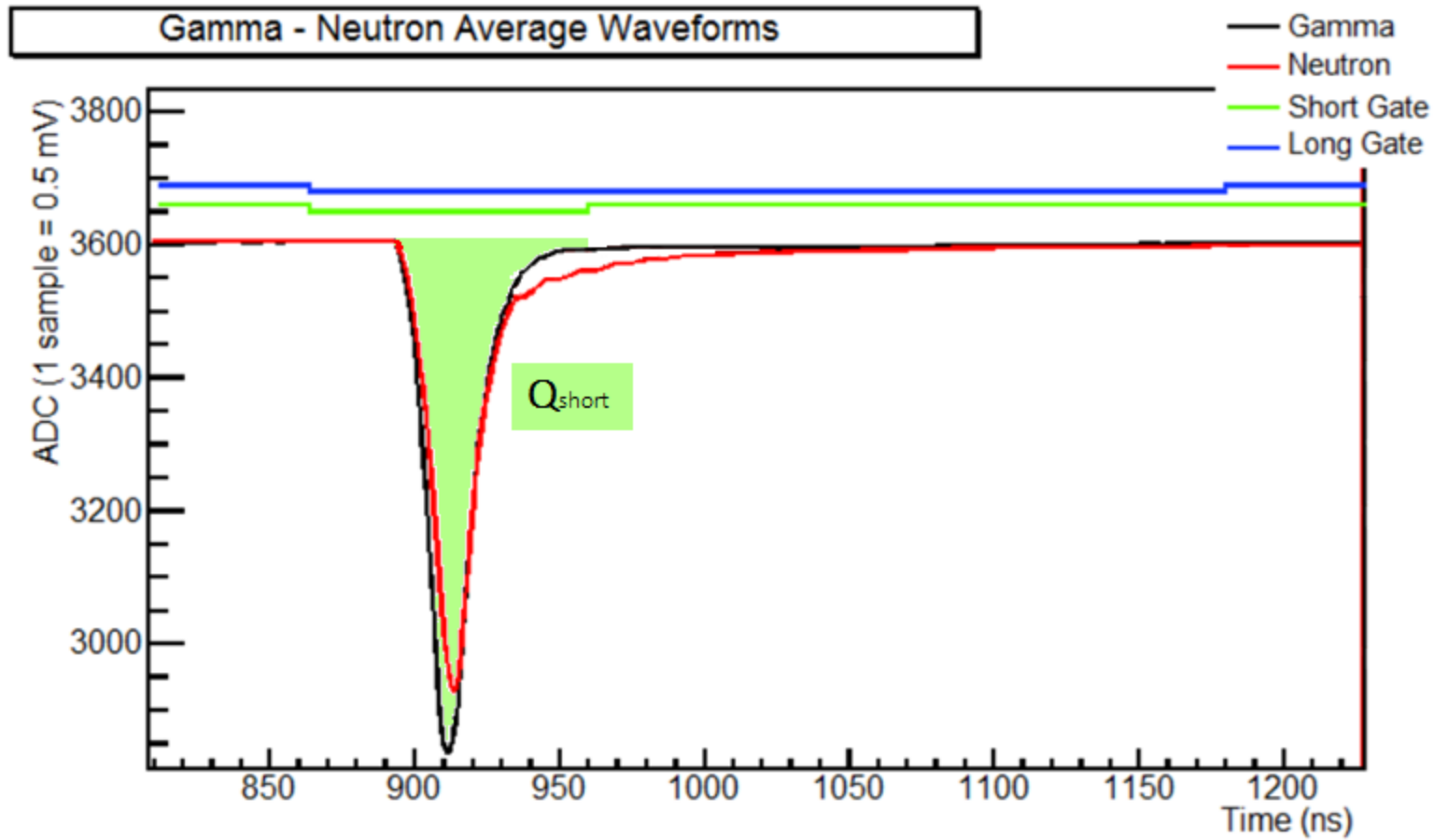
Pulse Shape Discrimination (PSD)

- Based on Signals from Particles with Different Specific Ionization

- Allows Charge Integration

- Allows Multiparametric Acquisition (Time + Energy + PSD)

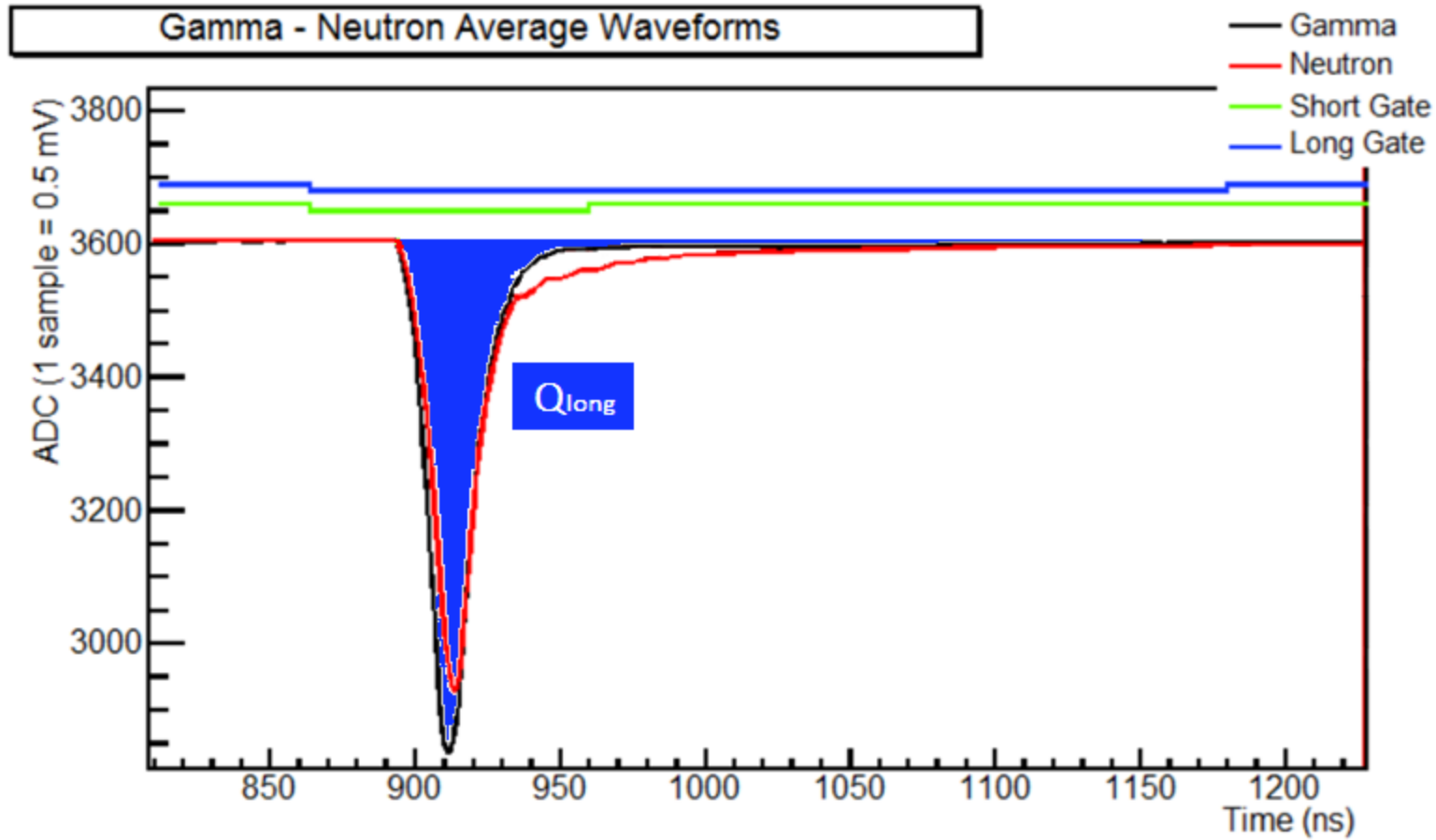- Suited for Direct Signals (no CSP)
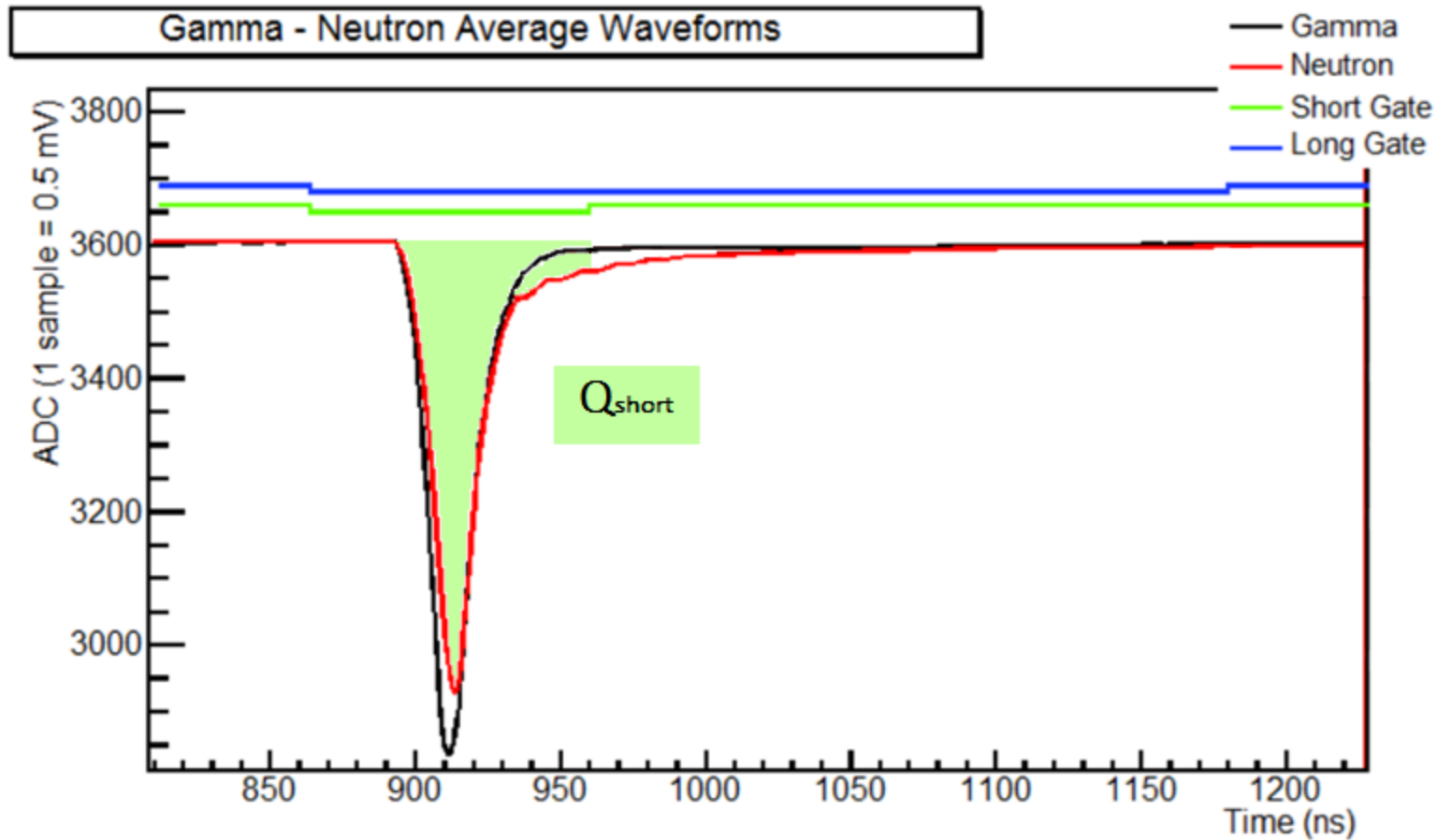
Pulse Shape Discrimination (PSD)
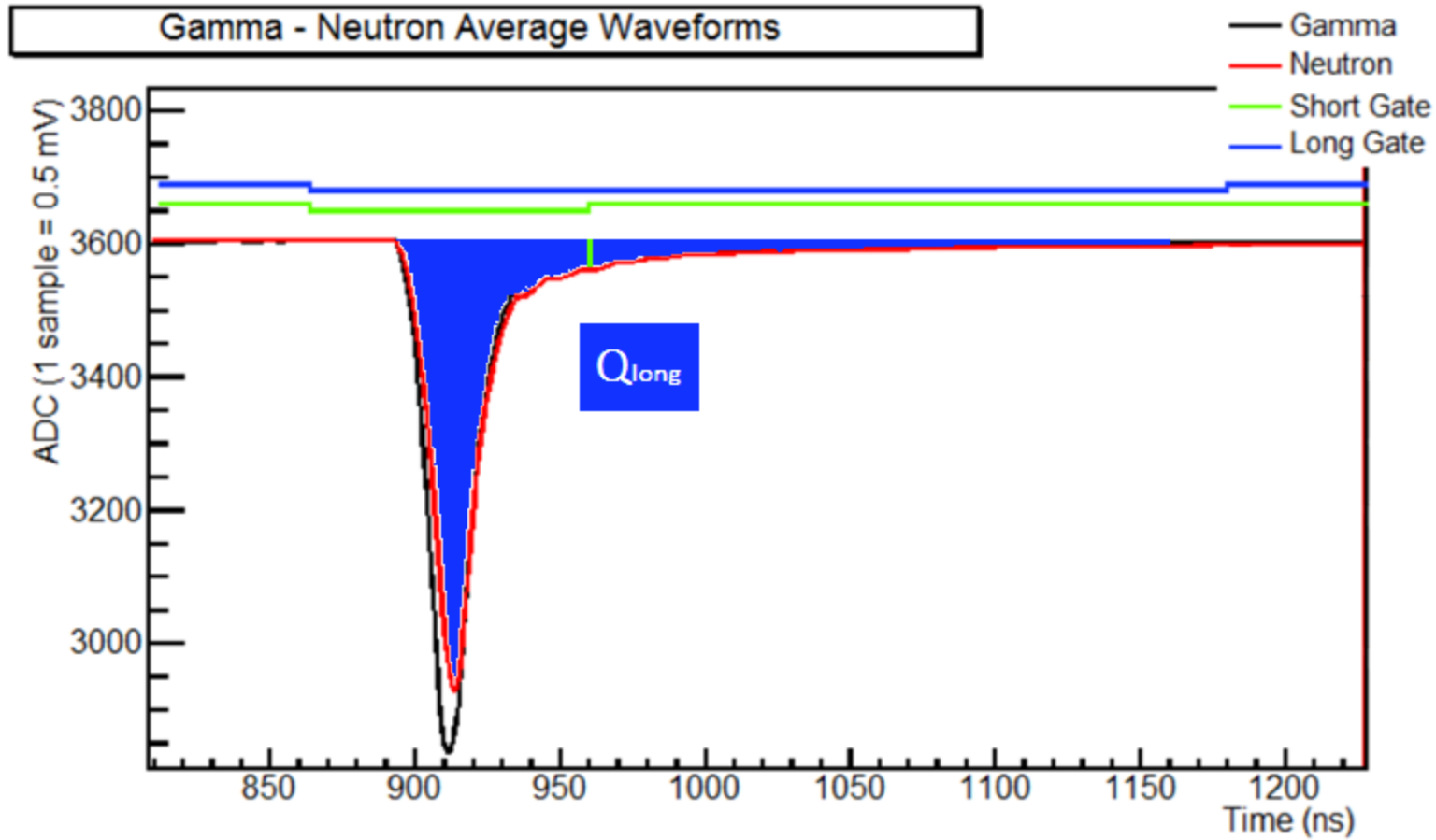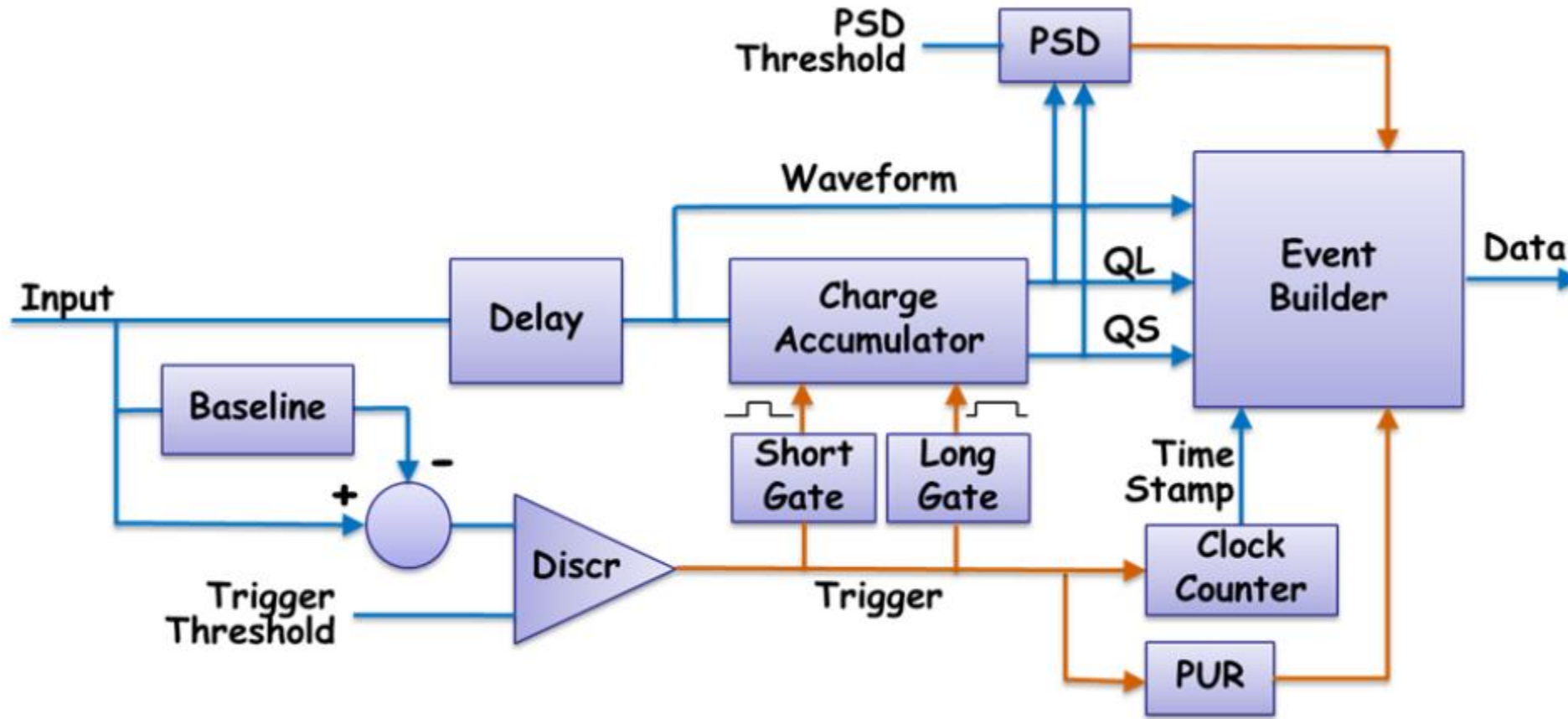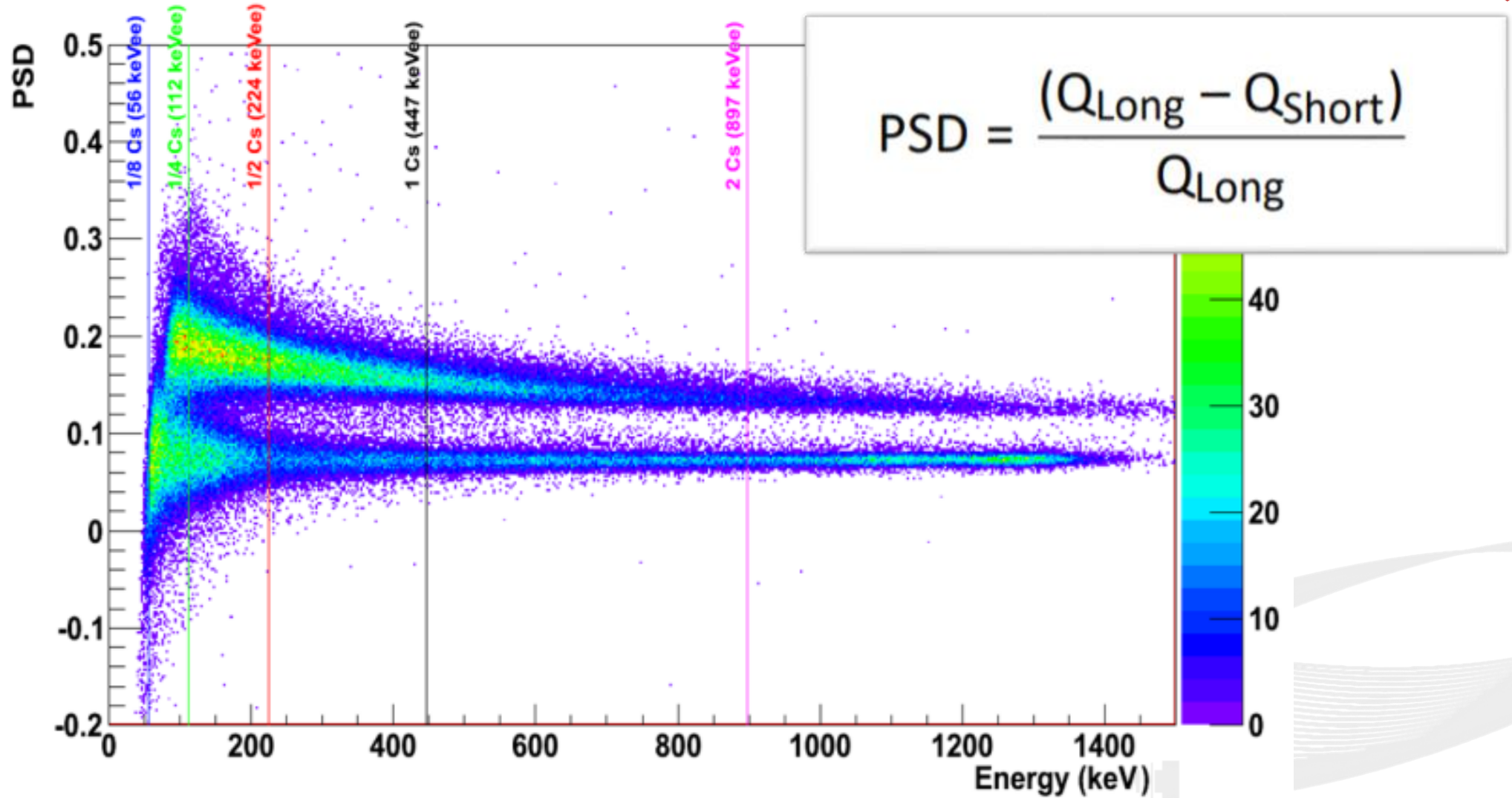
Pulse Shape Discrimination (PSD)

Pulse Shape Discrimination (PSD)

Pulse Shape Discrimination (PSD)

Pulse Shape Discrimination (PSD)

Pulse Shape Discrimination (PSD)

Pulse Shape Discrimination (PSD)

$$PSD = \frac{(Q_{Long} - Q_{Short})}{Q_{Long}}$$
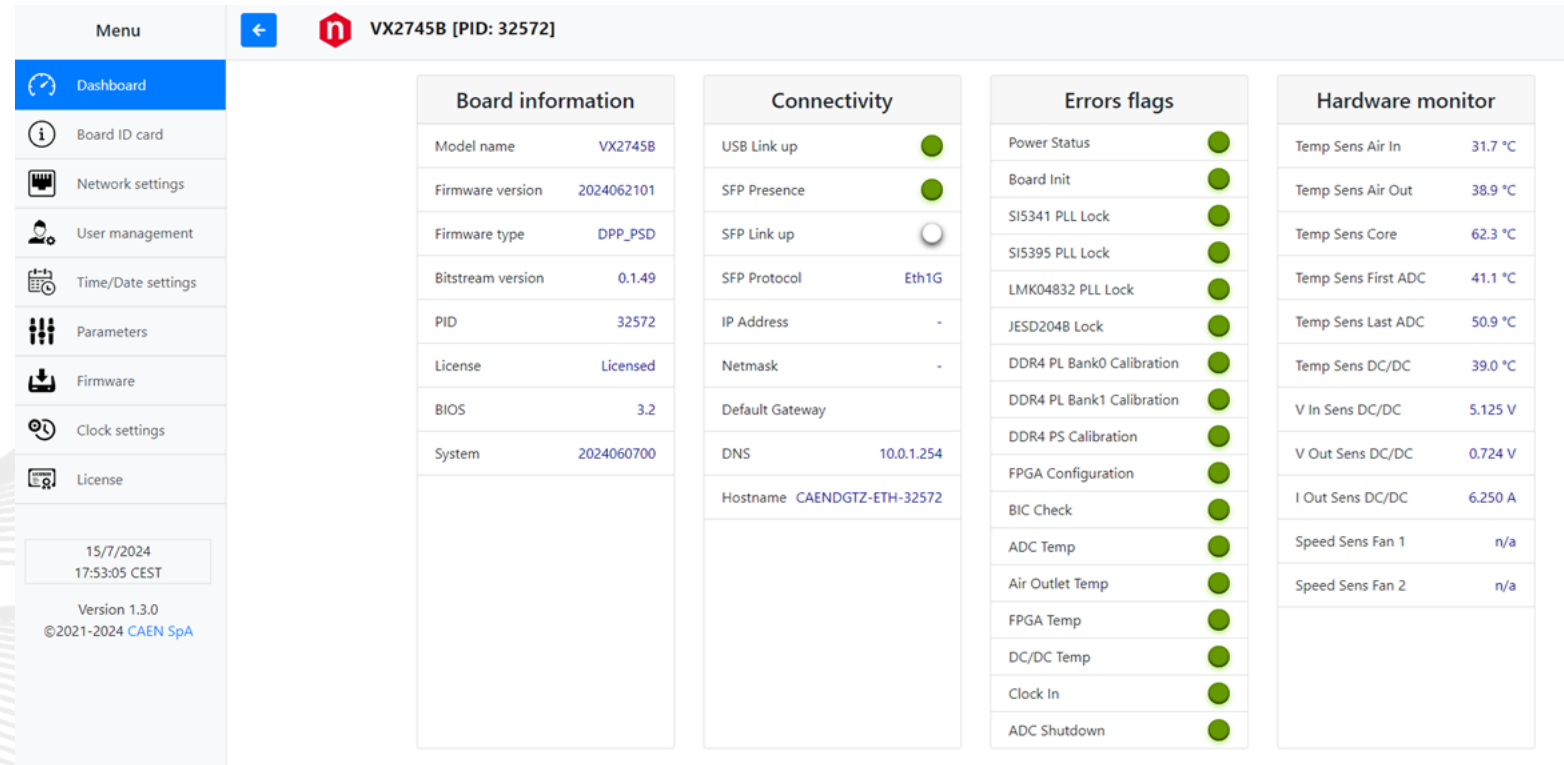
Na22 Decay Scheme

NaI + BaF$_2$

Thank you!

CAEN
Tools for Discovery
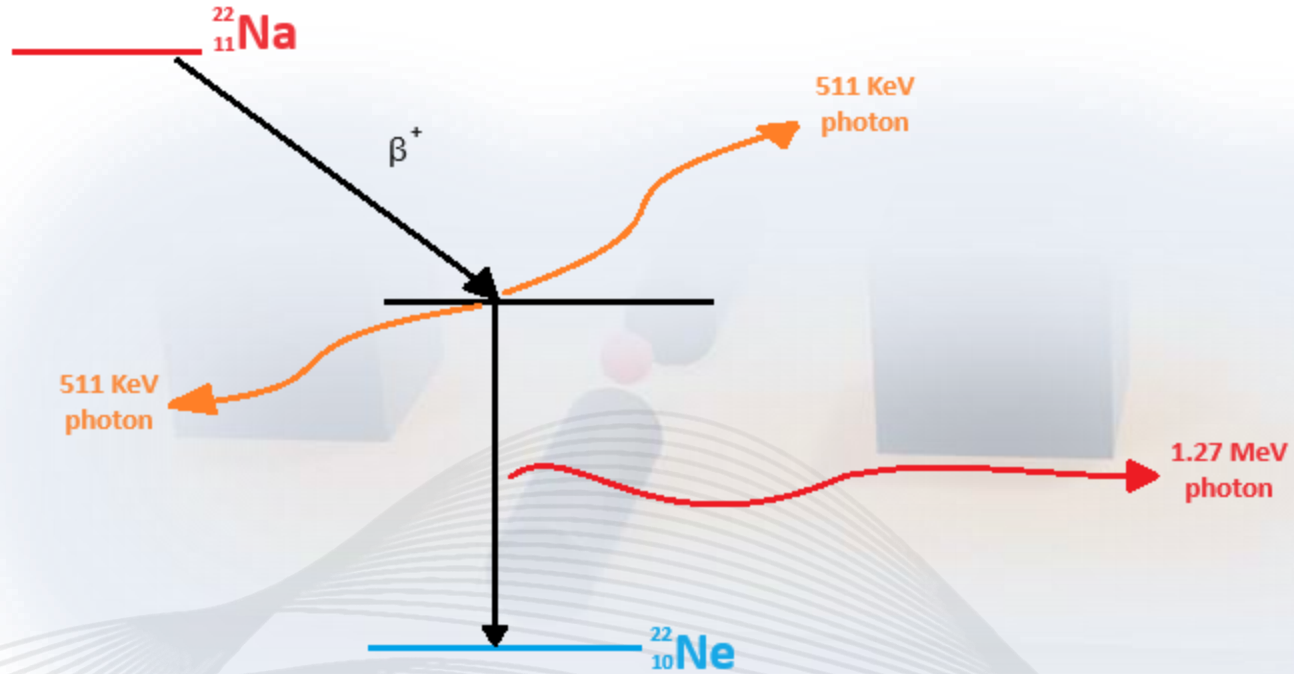
Digitizer's Web Interface

- Board information and status

- Network configuration

- Firmware upgrade

- License manager

- Clock settings

- Parameters page

WaveDump 2

- C++ software for CAEN Digitizer 2.0 running FW Scope

- User-friendly GUI

- Multi-board management

- Simultaneous plot of waveforms

- FFT and Samples Histogram provided runtime

- Data saving (ASCII or binary format)

- Import/Export of configuration presets

CAEN
Tools for Discovery